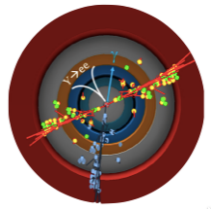


Starting sPHENIX

Topical Groups

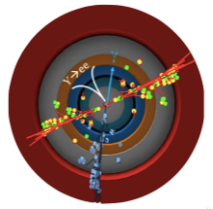
Dave Morrison
Gunther Roland



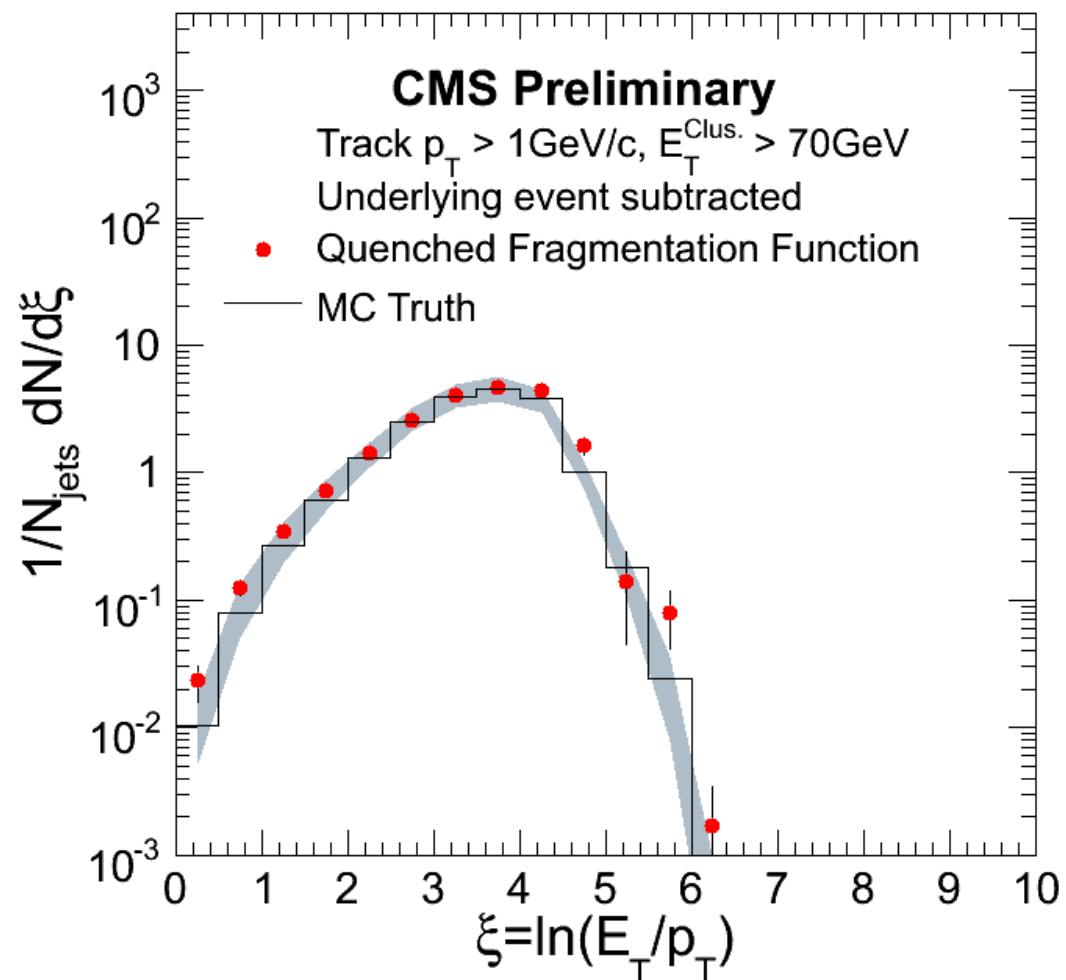
Why might we need *Topical Groups*?



- Core sPHENIX physics goal (“QGP microscopy”) will involve measurements beyond present state-of-the-art (at RHIC and LHC)
- LHC experience shows importance of interference of e.g. jet finding/track finding/background subtraction performance
- Ultimate physics performance difficult to judge based on simple performance measures (p_T resolution, average efficiency etc)
- Ideally, final design decisions should be based on complete case study for key measurements
- Proposal to create “Topical Groups” to perform small number of case studies for key physics measurements
- Many secondary benefits:
 - Provide landing spots for new groups, students, postdocs
 - Need-driven development of simulation, reconstruction capabilities
 - Work needs to be done in any case for future reviews



An example (from CMS HI)

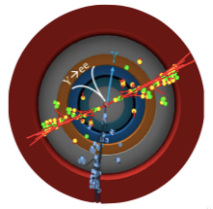


US CMS HI program got DOE approval based on detailed study of fragmentation function measurement in photon-jet events in PbPb using 0.5/nb @5.2TeV

To perform full simulated measurement, working group developed analysis framework, trigger strategy, simulation strategy (1B PbPb equiv.), photon reconstruction, background subtraction and optimized track and jet reconstruction

Experience provided a 5-year roadmap for actual CMS HI data taking and analysis



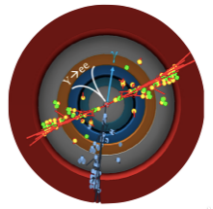


Thoughts about sPHENIX topical groups



- Test core aspects (in combination!) of detector performance at limit:
 - Jet, photon reco, electron ID, tracking in/near jets in central PbPb
 - Displaced track and secondary vertex reco (HF jet tagging)
 - Collection/reconstruction of pp reference samples
- Examples (to kickstart discussion)
 - Jet-track correlations (in/out-of-cone) in photon-jet events (fragmentation functions, jet shapes, missing p_T)?
 - b-jet R_{AA} or double b-tag jet A_J ; c-jet tagging?
 - $Y(2s)/Y(1s)$ PbPb/pp double-ratio for central events
 - b R_{AA} from secondary J/psi
- General thoughts
 - Pick fewest number of topics that provide complete evaluation of detector performance
 - Include a forward physics topical group? Ideas?
 - Consider feasibility of iterating studies for different detector configurations (simulation resources)
 - Consider interface with existing efforts (simulation/software meetings, tracking meeting, **project**)





Proposal



- Collect feedback, ideas, counter-proposals, criticism,.... now
- Iterate by email over the next week, formulate proposal by end of next week
- Form core of topical groups (if we decide to go ahead) or alternative effort by next general meeting in two weeks
- Kick-off with overview of current simulation/software status at next general meeting
- Regular reports on progress in general meetings - internal communication (meetings, mailing lists, Slack channels, Dropbox papers, twiki pages) organized by topical groups
 - Only constraint is that communication/participation has to be open to all collaborators
- Eventual outcome can be compiled in a series of papers (important for students, postdocs)
- **Key challenge** will be synchronization with other milestones/timelines, driven by lab, DOE or simple reality of trying to sPHENIX ready for beam
- Hopefully significant visible progress by May collaboration meeting